

### Remarks

In the Final Office Action of 15 October 2008, Claims 1-24 were pending with no claims yet allowed. Applicant respectfully requests reconsideration for the reasons below.

### Amendments to the Claims

Claims 2, 4, 6, 10, 12, 14, 18, 20, and 22 are currently amended for clarity to delete the recitation of *further* and to add the recitation of *to adjust*. Claims 10 and 12 are also amended to delete the recitation of *the first stage of fuel combustion*. No new search should be required.

### 35 U.S.C. § 112 Written Description Rejections

The Office maintains its rejection of Claims 1-24 under §112, first paragraph, for allegedly failing to comply with the written description requirement. Applicant respectfully requests favorable reconsideration for the reasons below.

### The Specification Includes An Actual Reduction to Practice

As the Office is aware, MPEP 2163 provides that “[p]ossession may be shown in a variety of ways including *description of an actual reduction to practice*” (emphasis added). Applicant directs the Office’s attention to page 10, line 21-page 11, line 1 of the application as filed, discussing various preferred embodiments of the invention using micro- and macro-stage for adjustment. Applicant also directs the Office’s attention to the examples on pages 13 and 14 of the application as filed showing three actual reductions to practice employing macro-staging to achieve benefits of the instant invention. In these reductions to practice, load parameters are given as well as parameters for macro-staging. For example, for shallow staging over-fired air ports contained a cooling flow of around 10% of the total air; for mid staging, over-fired air ports made up approximately 20% of the total air flow; and for deep staging, over-fired air ports made up approximately 30% of the total air flow.

Applicant also notes that reducing environments of the invention are described on page 12, lines 1-11. As described, a “reducing environment is one where the ratio of the concentrations of reducing radicals to oxidizing radicals is greater than about 1; more specifically, the ratio of the concentrations of H radicals to O radicals is greater than about 1.” Applicant notes that a “better reducing environment is one where the ratio of the concentrations

of reducing radicals to oxidizing radicals is greater than about 10; more specifically, the ratio of the concentrations of H radicals to O radicals is greater than about 10.” Applicant also sets forth that “an adequate reducing environment according to the present invention is one that will reduce SO<sub>3</sub> to SO<sub>2</sub> in less than about 2 seconds, more preferably, in less than about 0.5 seconds.”

Applicant also discloses temperatures necessary to create an adequate reducing environment in certain embodiments, e.g., “a reducing environment can be achieved when the first stage flue gas temperature is greater than or equal to 900 Kelvin (1160 degrees F), more preferably greater than about 1255 K (1800 degrees F), even more preferably greater than about 1650 K (2500 degrees F).”

Applicant also discloses on page 11, lines 4-6, that that for typical precipitators, SO<sub>3</sub> levels between about 10 to about 15 ppm (by volume) in the exhaust is desirable for best efficiency.

Applicant respectfully believes that the reductions to practice, as well as additional parameters set forth in the specification, are sufficient for establishing that Applicant was in the possession of at least the disclosed embodiment of the claimed invention. Favorable reconsideration is requested.

### **35 U.S.C. § 112 Enablement Rejections**

Claims 1-24 were rejected under §112, first paragraph, for allegedly failing to comply with the enablement requirement. Applicant previously noted that MPEP 2164.04 provides:

(1) The examiner has the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention. *In re Wright*, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993);

(2) The Examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure;

(3) It is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain *why* it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own **with acceptable evidence or reasoning** that is inconsistent with the contested statement.

Otherwise, there would be no need for the applicant to go to the trouble and

expense of supporting his presumptively accurate disclosure." *In re Marzocchi*, 439 F.2d at 224, 169 USPQ at 370. (bolding added); and

(4) To object to a specification on the grounds that the disclosure is not enabling with respect to the scope of a claim sought to be patented, **the examiner must provide evidence or technical reasoning substantiating those doubts.**

(see also USPTO Examiner Training Materials for § 112 at

<http://www.uspto.gov/web/offices/pac/dapp/1pecba.htm>)(bolding added)

In response to the Office's request for test data (28 February 2008 Office Action), Applicant noted that the application itself contains test data (see e.g., the Examples on page 13), and noted that MPEP 2164.02 provides that a "single working example in the specification for a claimed invention is enough to preclude a rejection which states that nothing is enabled since at least that embodiment would be enabled". Applicant further noted that the specification as filed:

(1) Discloses that precipitator function is optimized at SO<sub>3</sub> levels at 15 to 20 parts per million (ppm) in flue gas (page 2, lines 15-18);

(2) Discloses seven methods of increasing the residence time for actively adjusting the reducing environment such that SO<sub>3</sub> is reduced to SO<sub>2</sub>, and discloses four methods of increasing the reducing potential in the flue gas for actively adjusting the reducing environment such that SO<sub>3</sub> is reduced to SO<sub>2</sub> (page 9, lines 5-17); and

(3) Contains Examples showing (i) acceptable ratios of SO<sub>3</sub> to SO<sub>2</sub> at different staging depths to achieve embodiments of the present invention and (ii) % SO<sub>3</sub> reduction achievable thereby.

Applicant wishes to clarify that the seven methods of increasing the residence time and the four methods of increasing the reducing potential in the flue gas for actively adjusting the reducing environment are all clearly set forth as being **relative** to the operating conditions at a given plant. As such, and as previously noted, efficacious values would be readily apparent based on the existing operating conditions at a given plant.

Applicant previously requested that if the Office disagrees, it explain in more detail so that Applicant could better respond to the Examiner's concerns. As noted above, when "object[ing] to a specification on the grounds that the disclosure is not enabling with respect to the scope of a claim sought to be patented, **the examiner must provide evidence or technical reasoning substantiating those doubts.**" Applicant was unable to locate any discussion based on "evidence or technical reasoning" why adjustment relative to existing operation conditions at a given plant would require undue experimentation.

In its current *Response to Arguments* section, the Office states that "the test data on page 13 refer to the results that can be achieved and the effects, which are not enabling as it merely informs one of the end state and not how it was achieved". In response to this contention, Applicant respectfully directs the Office's attention to Applicant's response to the detailed discussion of the actual reduction to practice noted above, discussing macro-adjusting parameters used. Reconsideration is respectfully requested

### 35 U.S.C. §103

#### Claims 9-16

The Office maintains its 35 U.S.C. §103 rejections of Claims 9-16 in light of the combination of Kindig, Wright, and Carver. Applicant requests favorable reconsideration for the reasons below.

The Office still contends that Kindig discloses "adjusting the reducing environment such that SO<sub>3</sub> is reduced to SO<sub>2</sub> to achieve a desirable level of SO<sub>3</sub> (col. 13, lines 8-23, SO<sub>3</sub> and SO<sub>2</sub> are inherently produced during combustion, and reduction is inherently occurring)."

Applicant wishes to clarify that, in contrast to the instantly claimed invention, Kindig is directed to increasing the "reaction of sulfur dioxide to sulfur trioxide" (see, for example, the Abstract showing using specific coal, a sulfur sorbent, a sulfation propoter, and a catalyst for the reaction of sulfur dioxide to sulfur trioxide"). Indeed, the portion of Kindig cited by the Office is clearly directed to using a "catalyst for the reaction of sulfur dioxide to sulfur trioxide". Kindig discloses that "increased levels of sulfur trioxide are present in the combustion gas stream and are present for reaction with magnesium oxide to form magnesium sulfate". As such, Kindig discloses using a catalyst (not a redox adjustment in the reducing environment) to increase the

production of the sulfur trioxide (not reduce  $\text{SO}_3$  to  $\text{SO}_2$  to effectuate an overall decrease in  $\text{SO}_3$  for optimizing precipitator function).

Based on these facts, Applicant believes the Office's rejection is improper for at least two reasons:

(1) it fails to produce the claimed limitations; and

(2) it changes the principle of Kindig's operation from a catalyst based system designed to increase  $\text{SO}_3$  for increased reaction with magnesium oxide (MPEP 2143.01 provides that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious").

Regarding Wright, the Office contends that Wright is directed to "optimizing precipitator function (col. 1, lines 27-61) for the purpose of meeting clean air requirements." It is important to recognize, however, that Wright is apparently directed to problems associated with the burning of **low-sulfur coal**, e.g., that the burning of low-sulfur coal produces a flue gas with high resistivity, which negatively effects precipitator function (col. 1, lines 33-38). Wright discloses that "[o]ne solution to this problem has been to condition the boiler flue gas prior to its entrance into the electrostatic precipitator by the use of a **conditioning agent** to reduce the resistivity of the entrained particles within the boiler flue gas" (col. 1, lines 54-58). Wright does disclose that one of the known conditioning agents is sulfur trioxide (col. 1, line 61), and discloses that external sulfur flow to the flue gas can be controlled as needed to achieve the desired opacity of the stack effluent (col. 4, line 61- col. 5, line 12). Wright's preferred embodiment similarly makes clear that Wright's sulfur trioxide is produced by converting injected sulfur to sulfur dioxide with a sulfur burner, and the converting sulfur dioxide to sulfur trioxide with a sulfur dioxide conversion unit (col. 7, line 64 – col. 8, line 3). Thus Wright, similarly to Kindig, fails to disclose or suggest *actively adjusting the reducing environment such that  $\text{SO}_3$  is reduced to  $\text{SO}_2$  to effectuate an overall decrease in  $\text{SO}_3$  concentration and achieve a desirable level of  $\text{SO}_3$  for optimizing precipitator function.* Wright is injecting a chemical to increase the  $\text{SO}_3$  concentration for low-sulfur fuels.

Regarding Carver, the Office contends that:

Carver teaches actively adjusting, [to] effectuate an overall decrease in SO<sub>3</sub> concentration (abstract, figs.) for the purpose of meeting environmental regulations. It would have been obvious to one of ordinary skill in the art to modify Kindig by including actively adjusting, [to] effectuate an overall decrease in SO<sub>3</sub> concentration as taught by Carver for the purpose of meeting environmental regulations.

Regardless of this contention, still missing is any disclosure or suggestion of a method where *SO<sub>3</sub> is reduced to SO<sub>2</sub> to effectuate an overall decrease in SO<sub>3</sub> concentration and achieve a desirable level of SO<sub>3</sub> for optimizing precipitator function.* Again, Wright is injecting sulfur to increase SO<sub>3</sub>. For at least this reason, favorable reconsideration is requested.

Further, MPEP 2145 provides that “[i]t is improper to combine references where the references teach away from their combination”. As noted above, both Kindig and Wright are directed to the conversion of sulfur dioxide to sulfur trioxide. Based on the MPEP, Applicant believes it would be improper to attempt to combine Carver with either reference, because the Office is relying on Carver for its disclosure of *reducing* SO<sub>3</sub>. For at least this reason, Applicant requests favorable reconsideration.

If the Office maintains the current rejection, Applicant respectfully requests that it address each of these shortcomings with specificity so that Applicant can better respond.

Applicant respectfully notes that because Applicant has addressed certain comments of the Office does not mean that Applicant concedes other comments of the Office. Further, the fact that Applicant has made arguments for the patentability of some claims does not mean there are not other good reasons for the patentability of those or other claims.

#### **Claims 1-3, 8-11, 16-19 and 24**

The Office maintains its 35 U.S.C. §103 rejections of Claims 1-3, 8, 9-11, 16, 17-19 and 24 as being unpatentable over Carver in view of Fan and Wright. Applicant respectfully requests favorable reconsideration for the reasons above. In particular, Fan is unable to fulfill the above mentioned shortcomings in Wright, including: (1) providing missing limitations, and (2) providing a motivation to combine given the fact that Wright and Carver teach away from each other.

Applicant respectfully notes that because Applicant has addressed certain comments of the Office does not mean that Applicant concedes other comments of the Office. Further, the fact that Applicant has made arguments for the patentability of some claims does not mean there are not other good reasons for the patentability of those or other claims.

#### **Commonly Owned, Co-pending Applications**

Applicant also wishes update the Office on the status of two co-pending and commonly owned applications, United States Patent Application No. 10/797,513, and United States Application No. 10/798,088. These applications and the current application share a common priority claim to Provisional Application No. 60/544,724, filed 14 February 2004. These applications were both previously disclosed by supplemental IDS. Their common priority is set forth in each specification. In the interest of full disclosure, Applicant would also like to update the Office on the status of their prosecution.

Regarding Application No. 10/798,088, a notice of allowance was recently received. A copy of that Notice of Allowance is attached.

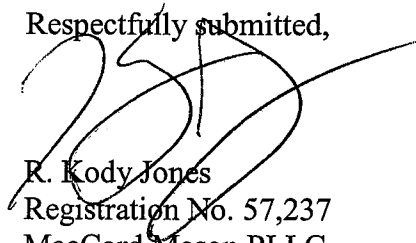
Regarding Application No. 10/797,513, no claims are yet allowed. A copy of the most recent Office Action is attached.

Applicant is making a similar disclosure statement for each of the above applications.

**Conclusion**

By this amendment, Applicant submits that he has placed the case in condition for immediate allowance and such action is respectfully requested. However, if any issue remains unresolved, Applicant's attorney would welcome the opportunity for a telephone interview to expedite allowance and issue.

Respectfully submitted,



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Date: 17 February 2009  
File No. 7340-010



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NOTICE OF ALLOWANCE AND FEE(S) DUE

4678 7590 01/29/2009

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EXAMINER

JOHNSON, EDWARD M

ART UNIT

PAPER NUMBER

1793

DATE MAILED: 01/29/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,088	03/11/2004	Brian S. Higgins	7340-012	6044

TITLE OF INVENTION: METHOD FOR IN-FURNACE REGULATION OF SO3 IN CATALYTIC NOX REDUCING SYSTEMS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$755	\$300	\$0	\$1055	04/29/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. \* THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
- B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE  
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**Alexandria, Virginia 22313-1450**  
**or Fax** (571)-273-2885

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

4678 7590 01/29/2009

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 P. O. BOX 2974  
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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,088	03/11/2004	Brian S. Higgins	7340-012	6044

TITLE OF INVENTION: METHOD FOR IN-FURNACE REGULATION OF SO<sub>3</sub> IN CATALYTIC NOX REDUCING SYSTEMS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$755	\$300	\$0	\$1055	04/29/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
JOHNSON, EDWARD M	1793	423-239100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1	_____
2	_____
3	_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee  
☐ Publication Fee (No small entity discount permitted)  
☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.  
☐ Payment by credit card. Form PTO-2038 is attached.  
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,088	03/11/2004	Brian S. Higgins	7340-012	6044

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EXAMINER
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JOHNSON, EDWARD M

ART UNIT	PAPER NUMBER
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1793

DATE MAILED: 01/29/2009

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 992 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 992 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

**Notice of Allowability**

Application No.

10/798,088

Examiner

Edward M. Johnson

Applicant(s)

HIGGINS, BRIAN S.

Art Unit

1793

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Applicant's amendment and IDS filed on 12/23/08.
2. ☒ The allowed claim(s) is/are 1-8 and 17-25, which have been renumbered 1-17, respectively.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 12/08
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

/Edward M. Johnson/  
Primary Examiner  
Art Unit: 1793



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,513	03/10/2004	Brian S. Higgins	7340-011	4226

4678 7590 09/02/2008  
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EXAMINER
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SUERETH, SARAH ELIZABETH

ART UNIT	PAPER NUMBER
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3749

MAIL DATE	DELIVERY MODE
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09/02/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/797,513

Applicant(s)

HIGGINS, BRIAN S.

Examiner

Sarah Suereth

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 17-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Response to Amendment***

1. Receipt of applicant's amendment filed on 03/17/08 is acknowledged..

***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/17/08 has been entered.

***Terminal Disclaimer***

3. The terminal disclaimer filed on 3/17/08 has been reviewed and is accepted.

***Claim Rejections - 35 USC § 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 17-34 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 17, line 5 states, "determining if the SCR system is to be by-passed". However, this is a mental step which does not produce a

concrete or tangible result, and thus is nonstatutory. A similar limitation is also in claim 25.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 17-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 17, line 5 states, "determining if the SCR system is to be by-passed". A similar limitation is also in claim 25.

8. However, the specification does not describe how this step is performed.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 17-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 17, line 5 states, "determining if the SCR system is to be by-passed". A similar limitation is also in claim 25.

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11. However, it is unclear exactly how this step is performed. For example, it is unclear whether a user or a controller performs the step, or what criteria is used to make a determination.

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. **Claims 17-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over **U.S. Patent No. 4,375,949 to Salooja ("Salooja")** in view of **U.S. Patent No. 4,029,752 to Cahn ("Cahn")**, and **applicant's admitted prior art**, and further in view of **U.S. Patent No. 4,196,057 to May ("May")** (previously cited) and **Altman (5,011,516)**.

Salooja discloses in the specification and figures 1-10 an invention in the same field of endeavor as applicant's invention and similar to that described in applicant's claims 17-34.

In particular, in regard to at least claim 17, Salooja discloses a method of reducing the acidity (each of nitrogen oxides and sulfur trioxides, see cols. 5-7) comprising the steps of:

c) partially combusting the fuel in a first stage to create a reducing environment in situ (see at least col. 1, lines 50-54);

d) maintaining the reducing environment for a sufficient time period such that reducible acids are reduced to a predetermined level to achieve a desirable acidity concentration in the flue gas (see at least col. 1, lines 54-59 and col. 7 lines 5-20 describing that the nitrogen oxides and sulfur tri-oxides are controlled to desired/predetermined levels);

e) combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment; thereby decreased the acidity of the flue gas by reducing the acid concentration of the gas (see at least col. 1, lines 60-63 and lines 29-33).

In regard to the limitation the reducible acids are reduced "by electron addition", while Salooja does disclose that the nitrogen oxides and sulfur trioxides are reduced, the reference does not appear to go into further detail as to the mechanisms of the chemical reduction, namely "by electron addition."

Cahn teaches a method of reducing sulfur oxides that is considered to be in the same field of endeavor as both applicant's invention and Salooja. Cahn describes that sulfur oxides in a process gas stream are reduced by reaction with ammonia (i.e.  $\text{NH}_3$ ) as a reducing agent (see at least col. 7, lines 48-52). Cahn clearly provides that sulfur trioxide is reduced in the same manner as the described processes for sulfur dioxide (see at least col. 7, lines 34-38). The examiner notes that at least ammonia ( $\text{NH}_3$ ) is considered to be the type of reducing radical described in applicant's specification (see specification p. 9, line 14 lists  $\text{NH}_i$ ). Further, the examiner also notes that Cahn also suggests that other reducing agents such as  $\text{H}_2$ ,  $\text{CO}$ , and  $\text{CH}_4$  (also listed in applicant's

specification) are recognized in the art as reducing radicals creating a reducing environment (see Cahn, col. 7, lines 65-68). This describes process of employing either ammonia or other above noted agent to result in the reduction of sulfur trioxide (a reducible acid) is considered to suggest the reduction by electron addition described in applicant's specification and claimed in claim 17.

Returning to Salooja, while this reference provides only some detail of the reducing of sulfur trioxides through the practice of the described method, there is clear suggestion that the reduction of sulfur trioxides is recognized in the art. Accordingly, a person of ordinary skill in the art at the time the invention was made would desirably modify the process in Salooja to incorporate the reduction by electron addition suggested by Cahn to desirably produce a gas stream that has "little or no" sulfur trioxide (see at least Cahn, col. 8, lines 41-46).

Regarding the limitations of determining if the SCR system is to be bypassed and then bypassing the SCR if determined to be necessary, applicant discloses in the specification that "an SCR is often only intended to be used for six months per year", and "are bypassed during the winter". This is regarded as an admission of prior art.

Salooja, Cahn, and applicant's admitted prior art teach substantially all of the limitations of the methods recited in claims 17-23 and 25-31, with exception of the steps of adjusting the reducing environment to lower the flue acid gas dewpoint (claims 17 and 23), improving ESP function (claims 17 and 25), and measuring acid dewpoint (claim 23). These additional steps have not been identified in Salooja, Cahn, and applicant's admitted prior art.

However, In regard to claims 17 and 25, the acid of concentration of the flue gas is directly related to the acid dew point temperature of the flue gas. This is expressly noted by applicant in applicant's description of the prior art, namely "...as the SO<sub>3</sub> concentration increases, the acid dew point temperature of the flue gas increases." (see applicant's specification, p. 1, lines 16-18). To further support this assertion the examiner also points to May. May discloses a method which provides that "[m]easurement of dew point enables a semi-quantitative determination of the sulfur trioxide concentration in the exhaust or flue gas" (see May, col. 5, lines 30-32 and 38-42). Accordingly, a person of ordinary skill in the art would understand that reduction of the acid concentration of the flue gas necessarily results in the lowering of the acid dew point level of the flue gas. As noted above, Salooja provides for the reduction of sulfur oxides from the effluent of flue gas of a furnace to a desired level (see at least col. 1, lines 54-59 and cols. 5-7). Therefore, a person of ordinary skill in the art would reasonably understand that obtaining the reduction target of the oxides in the flue gas as specified in Salooja would necessarily result in a corresponding desired dew point level (again see at least May, col. 5, lines 38-42).

Also in regard to claims 17 and 25, it is unclear whether the Salooja apparatus includes an ESP device. However, Altman teaches that fly ash is conventionally removed from combustion gases by electrostatic precipitation (col. 1, lines 7-10). Altman also teaches that the concentration of sulfur trioxide must be controlled to optimize the performance of the ESP filter (col. 1, lines 17-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Salooja apparatus to include the ESP device, as Altman teaches they are conventionally used to control fly ash (col. 1, lines 7-10).

Accordingly, a person of ordinary skill in the art would understand that reduction of the acid concentration of the flue gas necessarily results in optimizing the performance of an ESP device. As noted above, Salooja provides for the reduction of sulfur oxides from the effluent of flue gas of a furnace to a desired level (see at least col. 1, lines 54-59 and cols. 5-7). Therefore, a person of ordinary skill in the art would reasonably understand that obtaining the reduction target of the oxides in the flue gas as specified in Salooja would necessarily result in a corresponding improved performance of the ESP device (again see at least Altman, col. 1, lines 17-21).

In regard to at least claim 18 and 19, Salooja describes that a catalytic burner is supplied at least in the first stage that produces lower NO<sub>x</sub> production than conventional combustion systems (see at least col. 2, lines 7-12, col. 6, line 67 through col. 7, line 4 and col. 4, lines 31-47) and thus reasonably suggests micro-staging through the use of low-NO<sub>x</sub> burners.

In further regard to claims 18 and 19, as noted above, while the examiner considers that the operation of the catalytic burners suggests the recited micro-staging using low NO<sub>x</sub> burners, even if this is not a proper understanding, the examiner notes that applicant admits that the use of micro-staging using low-NO<sub>x</sub> burners to reduce emissions in combustion furnaces is known in the art (see admitted prior art of page 5,

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lines 4-18 of applications' specification). Accordingly, even if the operation of the catalytic burners of Salooja are not properly considered to be applicant's recited micro-staging using low NOx burners, a person of ordinary skill in the art would desirably seek to incorporate micro-staging using low NOx burners in the process of Salooja in order to desirably aid in reducing NOx emissions (see admitted prior art of p. 5, lines 4-18 of applications' specification).

In regard to at least claims 20-24 and 26-31, applicant also admits that the use of macro-staging using over-fired air and used in combination with micro-staging using low NOx burners is known in the art (see admitted prior art of page 5, line 19 through page 6, line 5 of applications' specification). Accordingly, a person of ordinary skill in the art would seek to employ macro-staging using over-fired air in a combustion stage and/or in combination of micro-staging using low NOx burners to desirably achieve NOx emissions reduction (see admitted prior art of page 5, line 19 through page 6, line 5 of applications' specification). Regarding claim 24, Salooja teaches burning a "carbonaceous fuel", which is considered to suggest coal.

Regarding claims 33 and 34, Salooja teaches reducing the concentration of sulfur trioxide to 18 ppm (col. 7, line 17).

In regard to claim 25, this claim includes limitations similar to that of claim 17 with the additional method step of "measuring the acid dewpoint of the flue gas." Salooja possibly does not expressly disclose actively measuring the acid dewpoint of the flue gas.

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However, May, as previously noted, clearly provides that the dew point of the exhaust gas is measured to determine a concentration of sulfur trioxide (see May, col. 5, lines 30-32). Further, May provides that the measurement of the dew point also allows for determination of "cold end" corrosion locations (May, col. 5, lines 32-34) and further that the inherent corrosion rate measurement that arises from the dewpoint measurement "indicates the degree of inhibition of an additive such as magnesium and the actual condition at the surface." (May, col. 5, lines 34-37).

Accordingly, a person of ordinary skill in the art would desirably modify the method of Salooja to incorporate measuring the acid dewpoint of the flue gas as taught in May to determine the level of corrosion that results from the additives in the flue gas (see May, col. 5, lines 30-37).

#### ***Response to Arguments***

14. Applicant's arguments with respect to claims 17-34 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah Suereth whose telephone number is (571)272-9061. The examiner can normally be reached on Mondays & Tuesdays 8:00AM-4:00PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven McAllister, can be reached (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sarah Suereth/  
Examiner, Art Unit 3749

/Steven B. McAllister/  
Supervisory Patent Examiner, Art Unit 3749